



ABSTRACT OF THE DISCLOSURE

An apparatus for applying closed-loop temperature controlled cold and heat therapy, with or without tactile stimulation, to an injured or otherwise traumatized part of the human or mammalian body. The apparatus comprises an easily transportable unit containing the insulated water reservoir, an integrated pump/heat exchanger powered by a small electric motor, microprocessor-based electronic temperature and fluid controls, and a pair of insulated fluid supply lines connected to a sealed bladder which is applied on or at the therapy site and held in place by means of a strap or wrap device. The cold/heat therapy is applied by re-circulating water from the heat exchanger through the bladder and back to the heat exchanger at a fixed rate which maintains the bladder at a constant temperature regardless of the heat load presented by the therapy site. The desired therapy temperature may be preset by the user or programmed to follow a desired therapy temperature profile. Therapy temperature is monitored by internal thermistors located in each of the fluid supply lines. The microprocessor-based control electronics monitor the thermistor output and control the pump/heat exchanger to maintain the preset therapy temperature or follow the pre-programmed therapy temperature profile. Tactile stimulation of the therapy site is created while maintaining the desired temperature at the therapy site by controlling the pump pressure such that the fluid pressure imposed upon the bladder varies in a cyclical manner, causing the bladder to expand and contract thereby creating

tactile stimulation, while maintaining the desired temperature at the therapy site via the heat exchanger. The tactile stimulation greatly increases the comfort of the cold therapy, thereby promoting longer and more beneficial therapy sessions. When used for cold therapy, the water or other fluid in the reservoir, which is mixed with the re-circulation water via the heat exchanger under control of the microprocessor, may be cooled using a multitude of mediums, such as block ice, ice cubes, crushed ice, sealed re-usable cold sources, or other readily available cold source. Similarly, when used for heat therapy, the reservoir fluid may be pre-heated externally before being placed in the reservoir or be actively heated via an immersible heater separate from the main unit. The therapy unit may be connected to a multitude of bladder shapes and designs for various therapy applications, or multiple bladders fluidly connected in series. The bladders are designed to accommodate substantial expansion and contraction in response to the varying pressures imposed by the pump to enhance the magnitude of tactile stimulation.